



VERTICALLY OPERATING FLIGHT VEHICLE  
FOR DRILLING AND AGRICULTURAL USE

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Translation of "Senkrecht arbeitende Flugsport-, Bohr- und Ackermachine," West German patent application P 35 21 624.7, Cologne, West Germany, June 10, 1985, pp 1-12.

(NASA-TM-77713)	VERTICALLY OPERATING FLIGHT	N86-21535
	VEHICLE FOR DRILLING AND AGRICULTURAL USE	
{National Aeronautics and Space		
Administration)	13 p HC A02/MF A01 CSCL 01C	Unclas
	G3/05	05723

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
WASHINGTON, D.C. 20546 MARCH 1986

1. Report No. NASA TM-77713	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle VERTICALLY OPERATING FLIGHT VEHICLE FOR DRILLING AND AGRICULTURAL USE		5. Report Date March 1986	
		6. Performing Organization Code	
7. Author(s) W. Pabst		8. Performing Organization Report No.	
		10. Work Unit No.	
9. Performing Organization Name and Address The Corporate Word, Inc. 1102 Arrott Bldg. Pittsburgh, PA 15222		11. Contract or Grant No. NASW-4006	
		13. Type of Report and Period Covered Translation	
12. Sponsoring Agency Name and Address National Aeronautics and Space Administration Washington, DC 20546		14. Sponsoring Agency Code	
15. Supplementary Notes Translation of "Sendrecht arbeitende Flugsport-, Bohr- und Ackermachine," West German patent application P 35 21 624.7, Cologne, West Germany, June 10, 1985, pp. 1-12.			
16. Abstract The invention deals with an aircraft which ascends and descends vertically and which is used for recreational aircraft, as well as for drilling and in agriculture. The invention combines the floating effect of a parachute with the helicopter to develop a flight vehicle with multiple uses which go beyond those of contemporary flight vehicles. Both hub mechanisms and thrust power are implemented to achieve this goal. Four designs are described in detail.			
17. Key Words (Selected by Author(s))		18. Distribution Statement  Unlimited	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 13	22. Price

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Patent Claims

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1. Vertically operating flight vehicle for drilling and agricultural use with central rotor engine and rotor arms, adjustable by pushing and pulling, whereby the airfoil consists of a rotating body-shaped, support-profiled or else interwoven cover which widens at the bottom. This cover is stabilized by a mast, which is braced centrally and vertically in the cover, and which is footed on the cover's underside.

2. Flight vehicle for drilling and agricultural use as in Claim 1 whereby the mast section which foots on the cover's underside represents the landing stand, in which the mast section's end drills into the ground or, as a substitute, into a shaft insert, and the tap driller is securely ankered for possible water landings so that the driller assumes the keel function.

3. Flight vehicle for drilling and agricultural use as in Claims 1 and 2 whereby the mast's footer end has coupling devices for drilling rods and agricultural tools.

4. Flight vehicle for drilling and agricultural use as in Claims 1 through 3 whereby the mast is designed at least partially as a pipe to hold propellant.

5. Flight vehicle for drilling and agricultural use as in Claims 1 through 4 whereby the outer edge of the cover has a flexible trim.

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\*Numbers in the margin indicate pagination in the foreign text.

6. Flight vehicle for drilling and agricultural use as /2 in Claims 1 through 5 whereby the cover's edge contains floatable air chambers or, as a substitute, a floating material capable of supporting a load.

7. Flight vehicle for drilling and agricultural use as in Claims 1 through 6 whereby an extension of the mast is equipped with a funnel-shaped shaft insert so that the mast can be connected to a second aircraft at this junction.

8. Flight vehicle for drilling and agricultural use as in Claims 1 through 7 whereby the cover has at least one transparent section, which is connected preferably with an escape hatch for floating executions.

9. Flight vehicle for drilling and agricultural use as in Claims 1 through 8 whereby the cover's connections and riggings to the mast are executed by collars allowing the cover's rotating device to be coupled to the mast and to rotate independently.

10. Flight vehicle for drilling and agricultural use as in Claims 1 through 9 whereby one possible type of control takes place by means of a control rod which moves to all sides and is cantilevered over the mast. The longer end of this control rod projects out over the bottom of the cover and forms a brush at the end.

11. Flight vehicle for drilling and agricultural use as in Claims 1 through 10 whereby the control rod is connected to a pilot seat.

12. Flight vehicle for drilling and agricultural use as in Claims 1 through 11 whereby the pilot's platform is situated in carousel fashion around the mast under the cover.

13. Flight vehicle for drilling and agricultural use as /3 in Claims 1 through 9 and 12 whereby a broad edge of the cover is subdivided with staves and fans out during landing while remaining folded up like a barrel during flight.

14. Flight vehicle for drilling and agricultural use as in Claims 1 through 9 and 12 through 13 whereby one possible type of control takes place by means of freely dangling tassles made of ropes which are pushed or pulled out of the cover.

#### Flight Vehicle for Drilling and Agricultural Use

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The invention deals with an aircraft which ascends and descends vertically and which is used for recreational aircraft, as well as for drilling in agriculture to plant fields. It can also be used as a remote-control robot. The flight vehicle needs no airport and can land equally well on an uneven field or water. It consists of a rotating body-shaped cover through the middle of which runs a vertically braced mast which may be subdivided and extended. On its upper end the mast bears the rotor engine, while it bores with its rotating footer end into the ground for landing purposes, whereby the flight vehicle is brought to a standstill, in which state it looks like a mushroom. To use the flight vehicle on rooftops or ships, a funneled shaft is installed in place of the hole in the ground. Furthermore, a support block is included on the mast as a guide to help hold the mast in vertical position during landings on impenetrable ground.

Vertical starting flight vehicles are generally helicopters. The common models have no airfoils, and, since gliding is not possible, it is highly likely that they will crash if the rotor blades fail. Generally, this results in severe accidents and death.

For this reason, the invention intends to combine the /5  
floating effect of a parachute with the helicopter, and to  
develop a flight vehicle with multiple uses which go beyond those  
of contemporary flight vehicles. This new vehicle makes use of a  
hub mechanism, as well as of thrust, and, for this reason, can be  
used especially well for drilling technology and in agriculture.  
The goal in this development also included making the vehicle  
usable without a pilot. It should be possible to start and land  
on any solid surface or water without changing equipment.  
Furthermore, the attempt was made to incorporate the angling  
effect of bird flight and insects' zig-zag flight into the  
technology to make the vehicles fly more precisely and safely  
than common aircraft do.

This goal was reached in the invention by attaching the rotor  
arms with adjustable hub and thrusting power around the head of a  
central mast. The rotor arms act on the cover which hangs like a  
ring around the mast so that the cover starts to oscillate in a  
predictable fashion. These oscillations are then relayed to the  
surrounding air by means of a flexible, for example, fringe-type,  
trim. For this reason, the connection between the cover and the  
remaining structural elements should be flexible. The cover is  
braced on the mast by means of collars or friction bearings which  
make it possible to couple the mast's rotating movement with the  
cover's rotating movement. The cover serves simultaneously as a  
protective hood for a pilot or payload platform which is arranged  
like a carousel around the central mast which is vertical for  
starting and landing. The platform is equipped with tilting  
seats so that the pilot and passenger remain seated in upward  
position when the mast pitches during flight. The cover has  
dome-shaped window surfaces for the pilot's orientation. At  
least one of these windows should be equipped as an escape hatch  
for water landings.

The cover may be rotating body-shaped and support- /6  
profiled or interwoven to reinforce it against breaking. For

larger and faster designs of the invention, a wide edge of the cover, subdivided with staves, fans out during landing while remaining folded-up like a barrel for the flight.

The invention's flight devices, which can go down on land, as well as on water, preferably have a bell-shaped cover, which, together with the pilot platform, form a cabin. The bell's edge is filled out with air chambers, or with floating or buoyant material. The mast, which has a heavy, hard tap drill on its footer end, assumes the keel function.

The adjustable rotor engine sits at the upper end of the mast, so that the rotor turning point lies over the mast's middle line. The mast is constructed totally or partially of pipes to intake propellant.

One possible type of control takes place by means of a control rod which moves to all sides and is cantilevered over the mast. The longer end of this control rod projects out over the bottom of the cover and forms a brush at the end. In the invention's simplest recreational application, a pilot sits on the upholstered short end of the control rod in the rider seat and controls the rod's position to the mast. Control using the pilot platform takes place by means of tassles attached to cords. These are released from the cover and/(or) by means of the adjustable rotor arms.

Use as a drilling machine results from the principle of the invention. The rotor which is connected centrally with the upper end of the vertical mast guides the mast in any desired pushing and turning direction, because its arms can be adjusted correspondingly. The motor's power can be switched thereby from hub to thrust, and the oscillations which support the drilling process can be produced, too. This process is similar to the percussion drill effect, but without exceptional overloading of the mechanical parts. The drilling rod consists of the mast's

extension pieces, which are coupled onto the mast and transported by the invention through the air to the drilling place for immediate use. The flight vehicle uncouples from the extension piece after drilling, and the process is repeated.

The invention also provides for a number of flight vehicles, varying in power and size, to be coupled together in stages for situations requiring greater power. The strongest vehicle, having the greatest diameter, operates in the bottom position. Coupling of the individual stages proceeds by alternating conical and sleeve-like mast ends.

The footer end of the mast is connected with suitable plowing and harrowing tools for agricultural use of the invention. These may be used as milling or pulling tools, as desired. During cultivation, the cultivator striates in hovering flight or in long rows, or also, beginning from a central point and then circling in a spiral.

Four design examples of the invention are shown in the drawings. They show:

Fig. 1: Two recreational sport flight vehicles with different control examples coupled one on top of the other,

Fig. 2: A floatable design with bell-shaped cover and pilot platform,

Fig. 3 and 4: A flight machine for drilling and agricultural use as a remote control robot,

Fig. 5: A design with staved cover edge, which is collapsed for flight, and /8

Fig. 6: The same vehicle prepared for landing with staves fanned out.



The four design examples have essentially the same structural elements. Cover 2 is hung around mast 1. Engine 3 with rotor arms 4 is located at the head of the mast; tap drills 5 are at the footer end.

In fig. 1, two different size recreational sport vehicles are coupled one on top of the other, so that the smaller vehicle's conical tap drill 5 fastens into the larger machine's tip which is equipped with funnel 6. The edges of the rounded cover have flexible fringe trim 7.

The smaller vehicle is controlled, for example, by means of two tassles 8, which are fastened to cord 9. These tassles dangle freely out of the cover or are drawn back into it. The other vehicle is controlled, for example, by control rod 11, attached to mast 1 by joint flange 10. The control rod protrudes out from under cover 2 and ends in brush 12. A seat 13 for the pilot is attached to the shorter end of control rod 1.

Covers 2 are fastened with bracing ropes or supports 14 onto collars 15 which lay down around mast 1. The covers have transparent window panes 16.

Figure 2 shows a detail of a bell-shaped cover 2, which is flanged on the edges to a double wall to form air chambers 17. These may be replaced by floatable or buoyant material. The outer edge of cover 2 has a flexible fringe trim 7, as in fig. 1. Pilot platform 19 is installed like a carousel inside cover 2. Platform 19 has an entrance 20 with collapsible ladder 21. A window, which serves as an escape hatch 22, is located in the upper portion of the cover. The water line is labeled 23. Tap drills 5 assume the keeling function.

Figure 3 shows how the invention may be used as an earth 9 drilling device. For this purpose, mast extension pipes 24 are driven into the ground 25 by the rotary arms' 25 rotating and

pressing movement. A possible gripping device is labeled 26. This vehicle's flexible trim 7 on cover 2 consists, for example, of a double row of tassles 27.

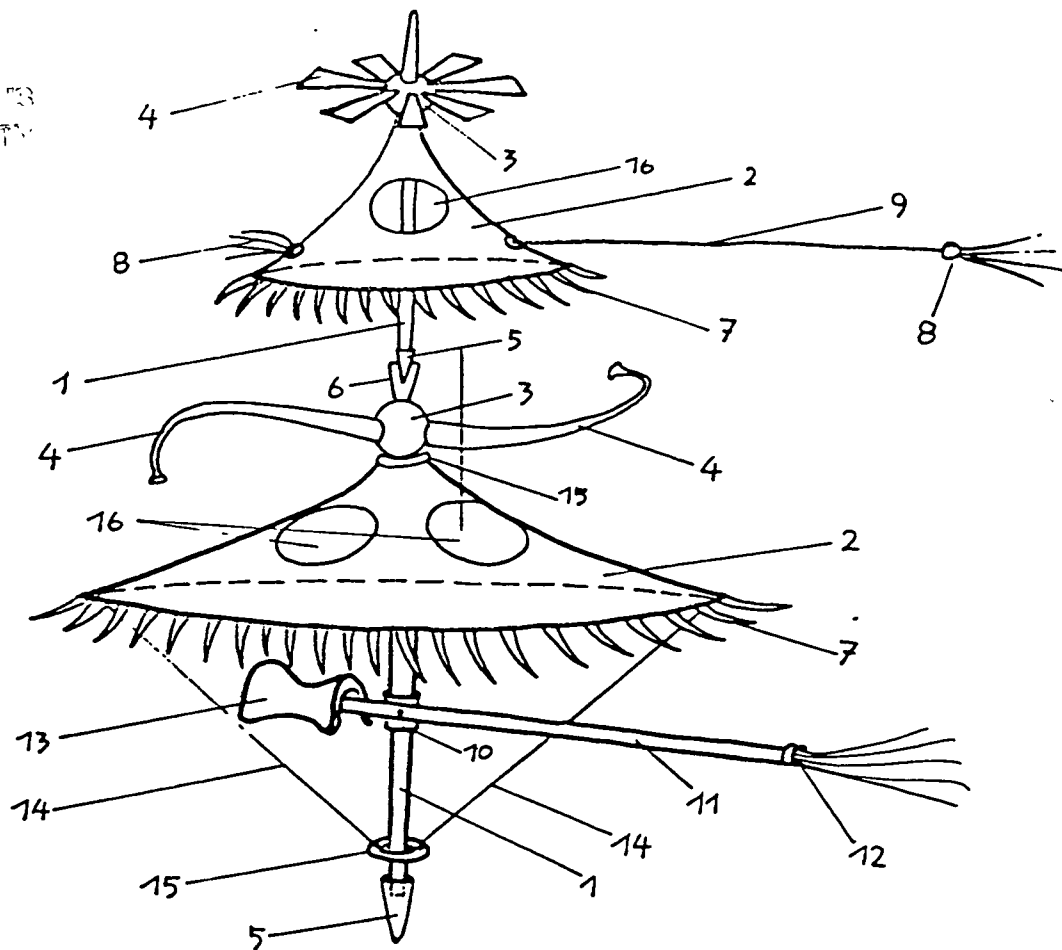
Figure 4 shows the same design for agriculture use whereby a rotating, three-prong plowshare 28 which turns with the mast is attached to the bottom of the mast. It is pulled back and forth through the plot of land 25 by the remote controlled vehicle. Above this device, we see harrower 29 which can be adjusted to slide up or down on mast 2. It is rotary drawn or can be pulled.

Figures 5 and 6 show a recreational flight vehicle on which the flexible trim is formed by a wreath made of widely spaced staves 30. These are arranged to swing around the cover's edge 31. Fanning is affected, for example, by supports 32, which are hung on one side around the mast on a sliding ring, on the other side on the staves 30, or by leverage of the stave ends protruding into cover 2.

While fig. 6 shows the parachute-like floating condition in which staves 30 are fanned, fig. 5 shows staves 30 collapsed to form a barrel shape. In this way, the vehicle has less resistance to the air during flight. A support block 34 is included on the mast to help during landings on impenetrable ground.

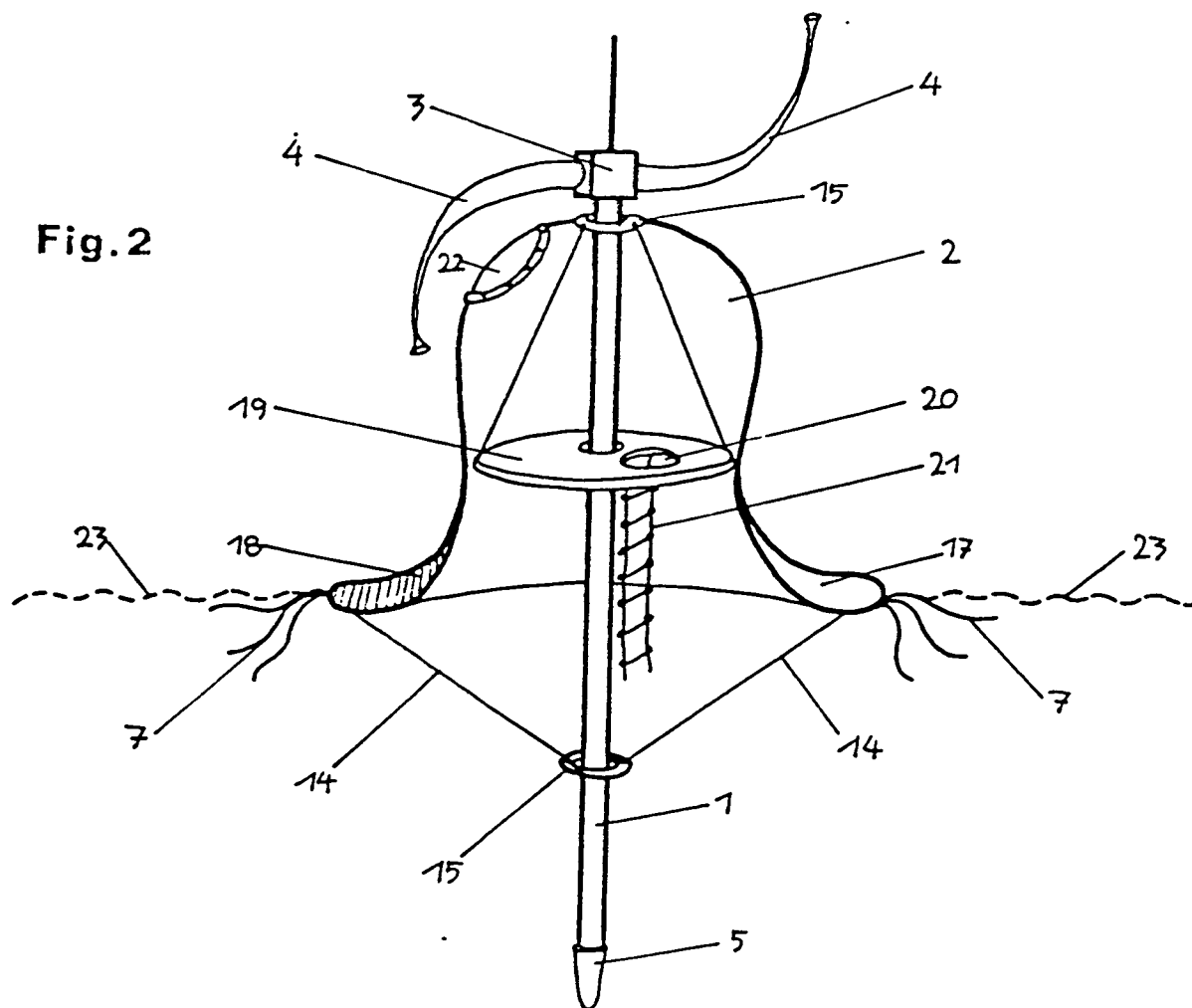
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Fig.1



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Fig.2



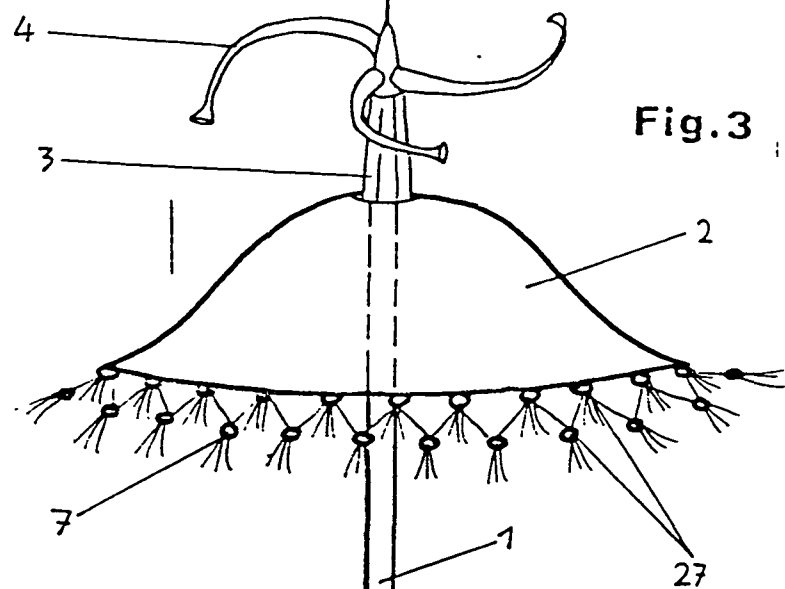


Fig. 3

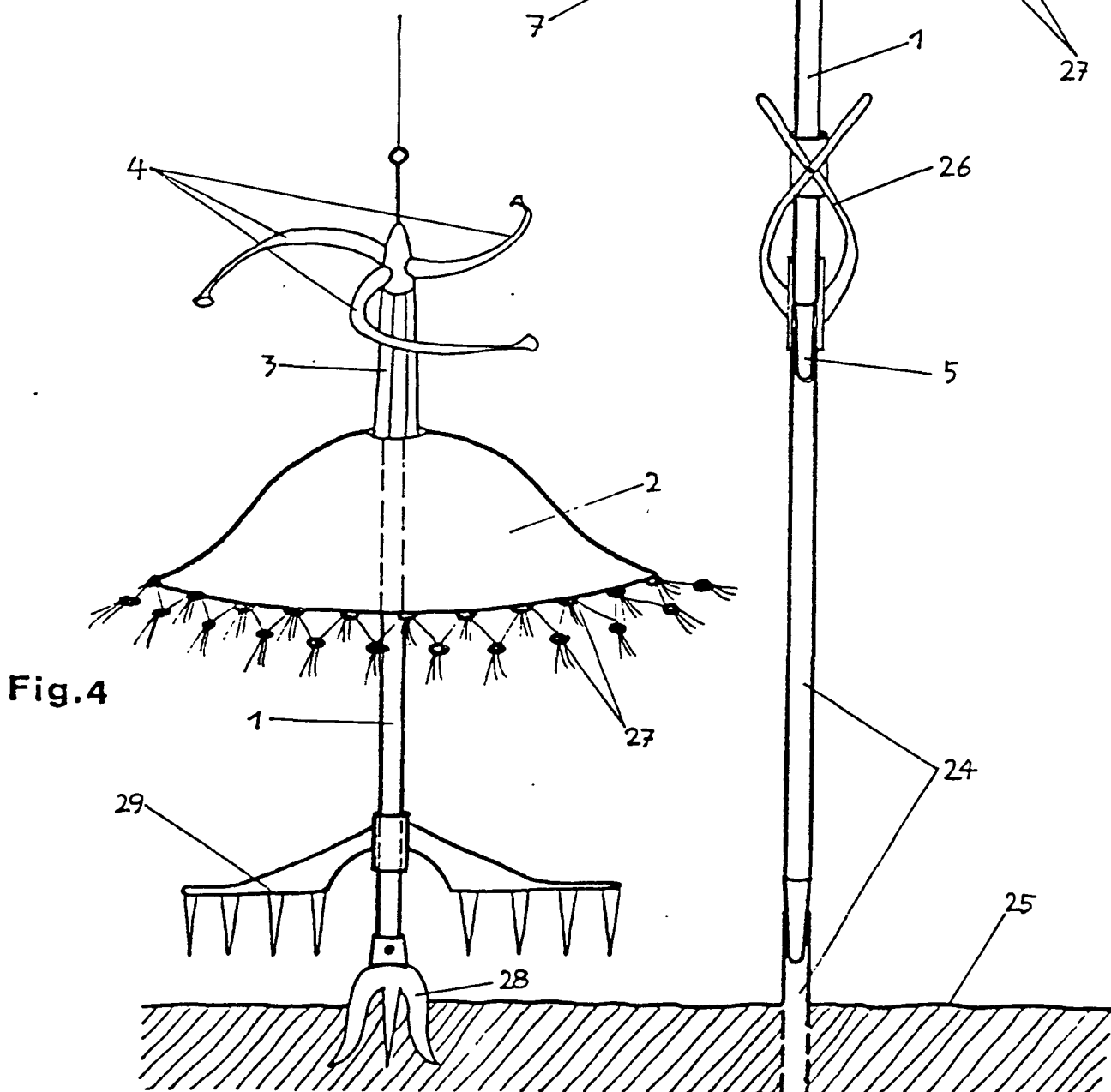


Fig. 4

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Fig. 5

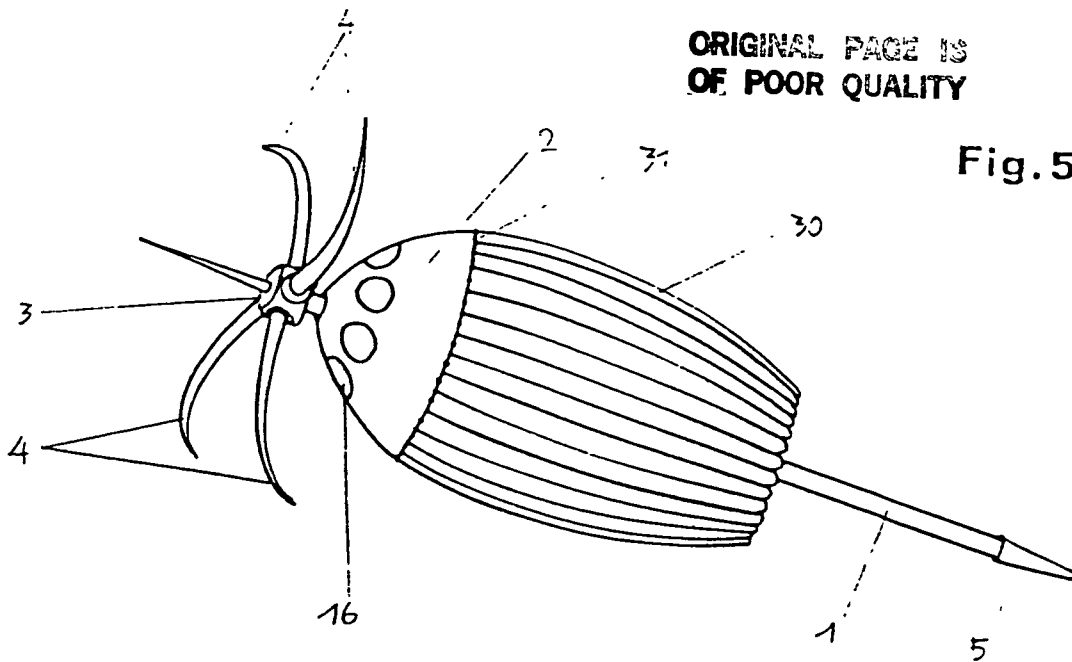


Fig. 6

